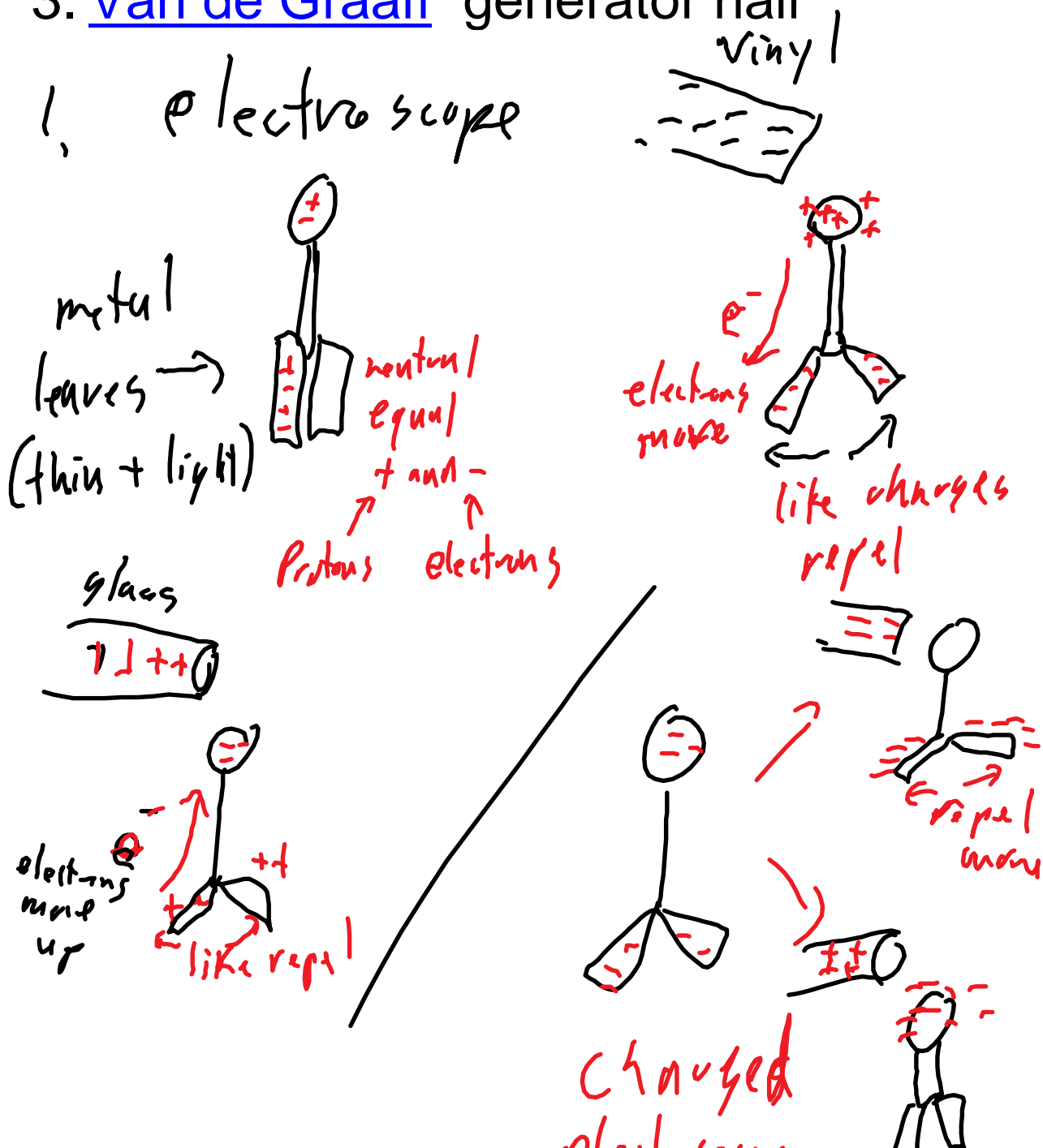


# Electricity Intro - Test Review

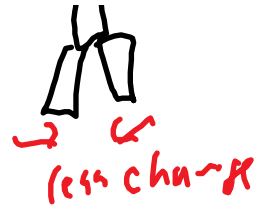
Demos: jacob's ladder

[https://www.youtube.com/watch?v=0w8QXyxa\\_Pk](https://www.youtube.com/watch?v=0w8QXyxa_Pk)

1. Rubbing vinyl strip and glass rod and bring to electroscope.
2. rubbing balloon and put on wall
3. Van de Graaff generator hair



Van de Graaff  
electroscope

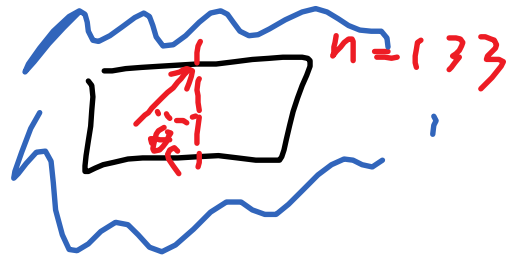


Homework - study for test  
think about the balloon on wall and  
the Van de Graaff generator and  
the hair.

p364 Q 24

$$\theta_c = 41^\circ$$

$$\theta_c = ? \quad \text{in water}$$



$$\theta_c = \sin^{-1} \left( \frac{n_r}{n_i} \right)$$

$$41^\circ = \sin^{-1} \frac{1.0003}{n_{SG}}$$

$$\sin 41 = \frac{1.0003}{n_{SG}}$$

$$n_{SG} = \frac{1.0003}{\sin 41} =$$

$$1.0003/(\sin(41)) =$$

$$1.524710362631826$$

$$\theta_c = \sin^{-1} \frac{1.33}{1.525} =$$

$$= \text{Asin}(1.33/1.5247) =$$

$$60.72734642596384$$

$$61^\circ$$

p364 Q13

do = 2.0 m below surface

1.5 m from on edge

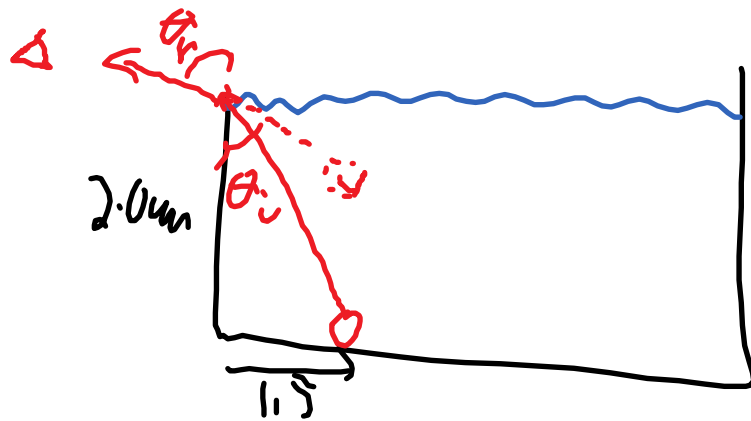
a)  $\theta_i$  SOHCAHTOA

b)  $\theta_r$

$\tan \theta = \text{opposite/adjacent}$



1.5



$$\tan \theta_i = \frac{1.5}{2}$$

$$\text{Atan}(1.5/2) = 36.86989764584402$$

$$n_i \sin \theta_i = n_r \sin \theta_r$$

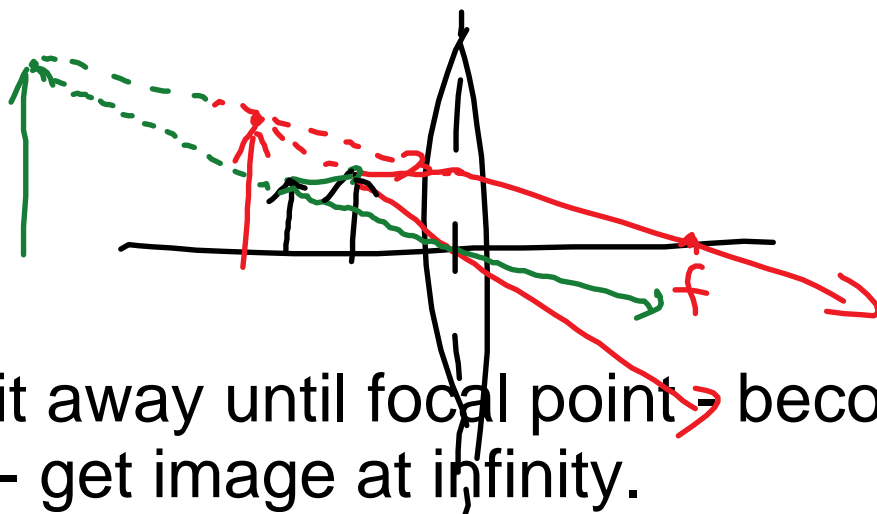
$$1.33 \sin(36.897) = 1.0003 \sin \theta_r$$

$$\theta_r = \text{Asin}(1.33 \times \sin(36.897) / 1.0003) = 52.96461923669438$$

$$53^\circ$$

shallower because your eye is tricked

PP 20 p383



move it away until focal point -> becomes blurry - get image at infinity.

Block 2-3

Electricity Intro - Test Review

## Demos:

1. Rubbing vinyl strip and glass rod and bring to electroscope.
2. Rubbing balloon and put on wall
3. Van de Graaff generator hair
4. Jacob's Ladder "bzzzzt"

## Big Idea:

There is a quantity called charge,  $q$ , with units of coulomb, C.

There are 3 types of charge, positive (protons because of up quarks), negative (electrons, down quarks) and neutral (neutrons, neutrinos, photons)

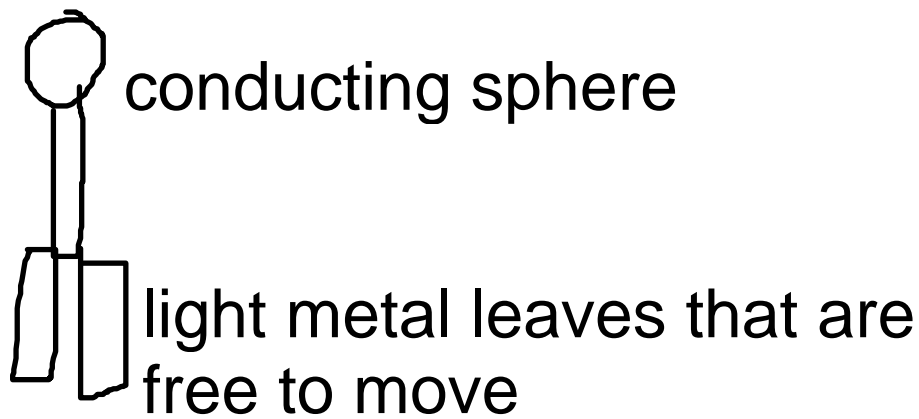
like charges repel

opposites attract

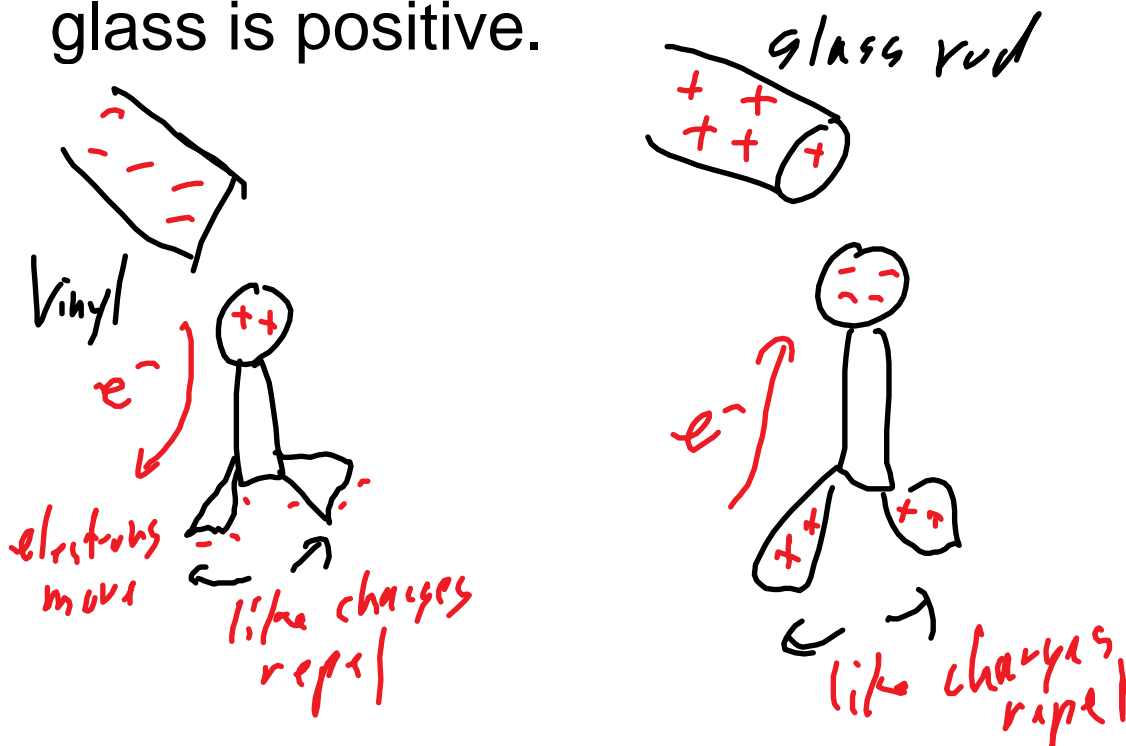
point neutral charges are not influenced by charge but some composite neutral objects are attracted to charge. Eg. the wall attracts the balloon.

Electroscope: a conducting sphere connected to very light metal leaves.





vinyl is negative when rubbed while glass is positive.



If the electroscope started neutral, both positive (glass) and negative (vinyl) charges cause the leaves to separate.

If the electroscope started negatively charged,





Homework study - think about the balloon and the Van de Graaff.

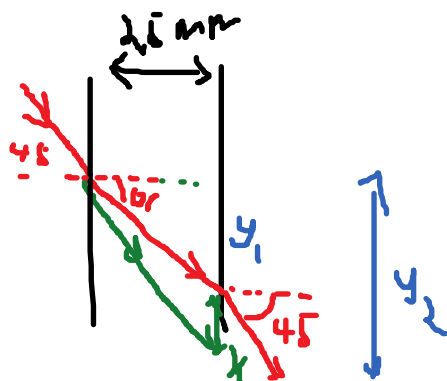
☐  Look at the review problems, pick a couple to go over. ch 17,18

☐

p365 Q15

$n=1.5$  25mm thick

$45^\circ$



$$n \sin \theta_i = n_r \sin \theta_r$$

$$1.0 \sin(45) = 1.5 \sin \theta_r$$

$$\theta_r = \text{Asin}(\sin(45)/1.5) =$$

$$28.1255057020557$$

$$\tan \theta = \text{opposite/adjacent}$$

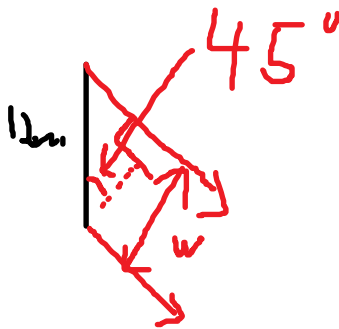
$$y_1 = \tan(28.1255) \times 25 =$$

$$13.36305889677562$$

$$x = 25 - 13.36305889677562 =$$

$$11.63694110322438$$

12mm off



$$w = ? \quad w^2 + w^2 = 11.6369^2$$

$$W = \text{Sqrt}(11.6369^2/2) =$$

$$8.228530901989733$$

8.2mm